

A CHECKLIST AND KEY TO THE SPECIES OF  
CAMPANULA NATIVE OR COMMONLY  
NATURALIZED IN NORTH AMERICA

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INTRODUCTION

This short conspectus of *Campanula* in North America (including Greenland) was prepared in the course of bio-systematic studies on the *C. rotundifolia* complex, as a means of better understanding the relationships of that complex to the whole genus. It is compiled in large part from the literature but includes a substantial number of original observations and measurements. The last conspectus of North American campanulas was published by Asa Gray in 1886 (Syn. Fl., ed. 2, vol. 2 (1) : 11-14, 395-96), in which 14 species were recognized. Six new species have been described since then, but there is at present no single source to which one can turn for even a simple listing, much less an inclusive key. The present conspectus is being offered, despite its brevity and compiled nature, in the hope that it will satisfy a practical need for many until an original revision can be completed.

I have made the key quite descriptive, more so than usual, because separate descriptions are not included in the checklist. Thus, while it is constructed primarily for flowering material, the condition in which campanulas are usually collected, one should be able to name most fruiting specimens by careful comparison of the extra descriptive material in the various leads, including geographical and ecological data. Additional information beyond what is supplied here should be sought in one or more of the appropriate regional floras and manuals, cited in my bibliography.

In the key, size ranges are sometimes given statistically, e.g., 28-208 (118) cm., when new measurements have been made. Statistical ranges can easily be recognized by the fact that the parenthetic number lies *between* the other two values given. This number represents the arithmetic mean, i. e., the average, and the other two numbers represent a



minimum-maximum range, derived by subtracting and adding two standard deviations from and to the mean. (All numbers have been rounded-off to the nearest whole number, so as to appear in the actual units of measurement.) These estimated ranges should include *approximately 95%* of the plants one will encounter. Owing to the tendency for size-distribution curves to be truncated below (no negative values) and asymptotically skewed above, a measurement as small as the estimated minimum will rarely if ever be found, and the transgressions of the estimated range that one will occasionally encounter will almost always be transgressions of the upper limit. Whenever possible, the statistical ranges were derived from samples of 25 or more, depending on the variability of the character, but limited material occasionally prevented samples this large.

Sometimes the parenthetic number is larger than the upper extreme, which means, according to customary procedure, that this value represents not an average but simply an uncommon upper extreme, and the min-max range represents observed values rather than statistical estimates. Observed values are given for relatively invariable or non-critical characters. In some cases the observed ranges were taken from the literature, but only after being verified personally.

Both the relative dimensions of the capsule and the relative position of the pores or slits of dehiscence can be extremely useful if not diagnostic in the determination of campanulas, and whenever possible collectors should take specimens with flowers *and* fruits. Not infrequently, however, one has only flowering material but really needs to use capsule characters for certain discrimination. While the relative dimensions (or shape) of the ovary are not likely to change significantly in the course of maturation, the position of the pores is virtually impossible to ascertain prior to actual dehiscence. However, the place of dehiscence tends, on a species basis, to be correlated with the width of the capsule, and more often than not the pores or slits will appear near the widest portion. This means that as a fairly



safe rule-of-thumb one can assume that dehiscence will be near the top if the ovary is widest above the middle and will be near the middle or below if the ovary is widest here. This rule will work best after anthesis and the beginning of maturation, when the capsule will quickly assume its characteristic shape if it has not before, but sometimes the rule will mislead on a given plant or even throughout an entire species (e. g., *C. divaricata*). Although species are very constant in the position of dehiscence, they can be quite variable in their capsule dimensions; hence, it is advisable to ascertain the average shape from as many ovaries as possible before attempting to use this rule.

The inflorescence is basically cymose in most species of *Campanula*, but this fact is seldom obvious. Secondarily, it is usually spicate, racemose, or paniculate, and floristic writers usually describe bellflower inflorescences in these terms. Such practice is simpler and not seriously misleading, and I have therefore followed it in my key.

Previous workers have described infraspecific taxa for at least one-third of the 20 native species recognized here, and doubtless some of these taxa are good. In virtually all cases, however, thorough taxonomic investigation is needed before valid judgment can be made, and I have refrained from formal recognition of any infraspecific taxa in this context.

Chromosome numbers, when known, have been given in the Checklist, and unless otherwise indicated these numbers have been taken from the Darlington and Wylie *Chromosome Atlas*.

#### ARTIFICIAL KEY TO THE SPECIES

1. Plants low or dwarf, 3-20 (35) cm. tall but mostly less than 15 cm., erect or decumbent perennials of alpine<sup>1</sup> or arctic situations, or erect, divaricately cymose-branched (pseudo-dichotomous), temperate annuals of low elevations. 2.
2. Annuals, divaricately cymose-branched, without rosette; hypanthium glabrous. Temperate species of low elevations (usually below 1200 m.), on dry rocky or grassy ridges and slopes, sometimes in scrub or chaparral. 3.



3. Corolla rotate, cut nearly to the base into linear-lanceolate lobes; style conspicuously exerted; capsule subglobose, opening at or below the middle. Grassy slopes. Chinsegut Hill, Fla. (Rare endemic) ..... C. ROBINIAE
3. Corolla campanulate or funnelform, never rotate nor cut below the middle, the lobes broadly lanceolate or deltoid-ovate; style included or barely exerted; capsule various. 4.
4. Corolla inconspicuous, 2-3.5 (2.5) mm.<sup>2</sup> long, about equaling length of calyx-lobes; stamens about 2 mm. long; leaves ovate, coarsely dentate; capsule urceolate, opening near the middle. Burns and disturbed places, Chaparral Zone. Mts. of N. Calif. (Endemic) ..... C. ANGUSTIFLORA
4. Corolla showy, 5-20 mm. long, conspicuously longer than calyx-lobes; stamens 4-6 mm. long; leaves oblanceolate or lanceolate to linear-lanceolate, remotely denticulate; capsule various. 5.
5. Calyx-lobes usually 1/2-2/3 length of corolla; corolla 5-12 (9) mm. long; plants several times branched, often starting from a few cm. above base of stem; capsule urceolate, opening near the middle. Rocky ridges and talus, Chaparral Zone. Mts. of N. Calif. (Endemic) .....  
..... C. EXIGUA
5. Calyx-lobes usually less than 1/2 length of corolla; corolla 5-17 (11) mm. long; plants profusely branched, usually starting at base of stem; capsule ellipsoid or obovoid, opening above the middle, from the top of the pore downward (unique; all other species open from bottom upward). Granite areas. Cent. Tex. (Endemic) .....  
..... C. REVERCHONI
2. Perennials, unbranched or with a few short lateral branches near the top, never appearing dichotomous, often with prominent rosette; hypanthium glabrous or pubescent. Temperate alpine (usually above 1500 m.) or arctic species, never in dry scrub or chaparral. 6.
6. Hypanthium villous, sometimes sparsely or only in lines; stems unbranched, one-flowered or rarely short-branched above and few-flowered. High alpine or arctic fell-fields, barrens, screes, rubbles, cliffs, talus, alluvial fans, sandy and gravelly shores, turfy tundra slopes and plains, dwarf shrub-lichen heaths, etc. Low to high arctic species, reaching southward only in scattered high alpine situations, if at all. 7.
7. Corolla large, showy, usually over 20 mm. long, tubular or deeply campanulate or funnelform, spreading or nodding<sup>3</sup>; anthers never under 4 mm. long; calyx-lobes entire or toothed, erect or spreading, but never connivent; rosette usually prominent; lower leaves broadly obovate, spatulate



- or oblanceolate, uniformly crenate or serrate; plant not appearing fleshy; capsule broadly urceolate or obconic. 8.
8. Calyx with reflexed auricular appendages between the lobes, the lobes entire (rarely crenate-serrate); lower leaves broadly spatulate or obovate, crenate; capsule pendant, opening near the base. Alpine zone. Aleut. Is. (Amphi-Pacific) ..... C. CHAMISSONIS
8. Calyx without appendages, the lobes with 1-several sharp teeth or lacinations; lower leaves broadly oblanceolate, remotely sharp-serrate or lacinate; capsule erect, opening near the top. Partial to rocky or gravelly sites. Widespread in Alaska from Aleut. Is. to Arctic Slope, eastward in scattered localities to Great Bear Lake, Mack. (NWT), southward in mts. to N. Wash. (Amphi-Pacific) ..... C. LASIOCARPA
7. Corolla small, inconspicuous, seldom over 12 mm. long, funnelform, erect to nodding; anthers 1-3 mm. long; calyx-lobes entire, erect, appressed to corolla, sometimes connivent; rosette absent or few-leaved, not prominent; lower leaves narrowly obovate or spatulate, entire or less often irregularly crenate; plant appearing fleshy; capsule distinctively obovoid or clavate, usually broadest just above the middle, erect, opening near the top. Partial to calcareous, often turfy or alluvial, sites. Widespread but scattered, in Alaska from E. Aleut. Is. to Arctic Slope, eastward to Ellesmere Is. and Greenl., southward in Rocky Mts. to Utah and Colo. and to Shickshock Mts., Que. (Circumpolar, with large range gaps) ..... C. UNIFLORA
6. Hypanthium glabrous, scabrellous or hirtellous; stems characteristically unbranched, one-flowered, but in some species rather frequently few-branched above. Habitats various. Temperate sub- and low alpine or arctic species. 9.
9. Hypanthium sparsely to densely scabrellous or hirtellous; plants rarely over 10 cm. tall; leaves mostly basal or nearly so; capsule urceolate, ellipsoid, or short-obconic, opening near the middle or above. Alpine fell-fields, screes and crevices. 10.
10. Leaves sharply and coarsely serrate or dentate; plants sparsely to densely scabrellous above, including hypanthium, glabrous below; calyx-lobes usually with 1-several sharp teeth. Olympic Mts., Wash. (Endemic) ..... C. PIPERI
10. Leaves entire; plants uniformly scabrellous or hirtellous throughout, usually densely so; calyx-lobes entire. N. Calif. to Wash., eastward to Ida., W. Mont. (Endemic) ..... C. SCABRELLA



9. Hypanthium glabrous; plants often much over 10 cm. tall; basal leaves frequently absent, cauline ones sometimes many; capsule various. 11.
11. Corolla rotate or shallowly campanulate-spreading, cut well below the middle; style conspicuously exerted, often recurved; calyx-lobes usually with 1-several prominent teeth near base; leaves narrowly lanceolate or oblanceolate, remotely denticulate; capsule obconic, erect, opening near the top. Dry limestone talus and cliffs, alpine crevices and rocky places, gravelly stream-banks, etc. South Slope of Brooks Range, Cent. Alaska, to Cent. Yuk. and S. W. Mack. (Endemic) .... C. AURITA
11. Corolla shallowly to deeply campanulate or funnelform, never truly rotate, seldom cut below the middle; style shorter than to barely exceeding corolla, not recurved; sepals toothed or entire; leaves and capsules various. 12.
12. Anthers 1-3 mm. long; corolla short-funnelform, seldom over 12 mm. long, erect to nodding; calyx-lobes erect, appressed to corolla, sometimes connivent, entire; plant appearing fleshy, one-flowered (very rarely few-flowered); lower cauline leaves entire or irregularly crenate; ovary and capsule distinctively obovoid to clavate, usually broadest just above the middle, erect, opening near the top. (Cf. No. 7 above for habitats and distrib.) ..... C. UNIFLORA
12. Anthers 3.5 mm. or mostly longer; corolla variously shaped, often much exceeding 12 mm. long, erect to nodding; calyx-lobes if erect and appressed never connivent, sometimes toothed; plant not appearing fleshy, frequently several-flowered (on short axillary branches above); lower cauline leaves usually sharp-toothed, at least remotely; ovary and capsule variously shaped but seldom broadest near the middle, erect or nodding, opening above or below. 13.
13. Plants 2-14 (8) cm. tall, completely glabrous; longest cauline leaves 7-17 (12) mm. long, ovate or lance-oblong with cuneate base, sharply denticulate or serrate at least at apex; corolla shallowly funnelform, 9-15 (12) mm. long, cut nearly or quite to the middle, erect; capsule obconic, erect, opening near the top. Moist subalpine meadows and stream-banks. Mts. of N. Calif. (Endemic) ..... C. WILKINSIANA
13. Plants mostly over 10 cm. tall and often to 20 cm. or more, usually pubescent below at least in lines or



with ciliate leaf bases; longest cauline leaves rarely under 20 mm. and usually much longer, linear- to ovate-lanceolate or oblanceolate, remotely serrulate or occasionally close-serrate; corolla variously shaped, seldom as short as 15 mm. or cut to the middle; capsule various. 14.

14. Plants glabrous except for ciliate bases of lower cauline and rosette leaves, *the cilia 0.5-0.7 (1.0) mm. long*, typically one-flowered but not infrequently with several axillary flowers above; corolla funnelform-spreading, erect; calyx-lobes erect, appressed to corolla, usually with several conspicuous denticulations near base; capsule obconic, erect, opening near the top. Subalpine meadows and open rocky or gravelly places. Rocky Mts.: Ariz. and N. Mex. to W. Mont., Cent. Ida., and Wenatchee Mts., Cent. Wash. (Endemic) ..... **C. PARRYI**

14. Plants glabrous or more often hirtellous below at least in lines on stem and leaf-bases, but *hairs never longer than 0.2 mm.*, typically with 2-many flowers but sometimes reduced to 1 in extreme alpine situations; corolla deeply campanulate or funnelform to tubular, divergent or nodding; calyx-lobes if erect seldom appressed to corolla, always entire; capsule hemispherical or broadly urceolate, pendant (apparent in herbarium material by conspicuously arcuate pedicel), opening near the base. Subalpine to alpine and arctic meadows, fell-fields, screes, crevices and ledges, gravelly talus, alluvial fans, moist rocky shores, etc. Widespread, E. Aleut. Is. to S. Greenl., southward to Ore., Colo., Que., and Nfld. (Circumpolar) ..... **C. ROTUNDIFOLIA** [Highly polymorphic species with extremely wide ecological amplitude. Only dwarf arctic-alpine specimens are intended to key out here; others should key out in next section.]

1. Plants tall, typically much over 20 cm. but occasionally shorter (cf. especially *C. scouleri* and the marsh species, which all key out here), erect, decumbent, or weak and reclining biennials or perennials, or if annual then not divaricately cymose-branched (*C. americana*), only of temperate latitudes and low elevations (except *C. rotundifolia*, which keys out in both sections). 15.
15. Stem slender, weak and more or less reclining, sometimes retorsely scabrous; inflorescence very lax, with terminal and



- axillary flowers on slender pedicels; corolla rarely to 20 mm., usually much shorter; capsule short-hemispherical to subglobose, opening at or below the middle. Wet meadows, marshes, swamps, and bogs. 16.
16. Corolla rotate, cut almost to the base into linear-lanceolate lobes; stem and leaves glabrous; leaves narrowly lanceolate or oblanceolate, crenulate or crenulate-serrulate. Marshes, swamps, and wet borders and waysides. Fla. Peninsula. (Endemic) ..... C. FLORIDANA
16. Corolla campanulate or funnelform, rarely cut below the middle, the lobes broadly lanceolate or deltoid-ovate; stem and leaves (midribs and margins) usually retrorsely scabrous; leaves various. 17.
17. Leaves linear or narrowly lanceolate or oblanceolate (rarely ovate), mostly 3 cm. or longer, entire or remotely serrulate; corolla 6-12 mm. long; calyx-lobes entire or with a basal pair of denticulations. Wet meadows, marshes, swamps, and bogs. E. and Cent. U. S. and adjacent Can.: Sask. to Que., southward to Nebr., Mo., and Ga. (Endemic) ..... C. APARINOIDES
17. Leaves short-ovate, elliptic or obovate, to 2.5 cm. long, obscurely to prominently crenate-serrate at least above the middle; corolla 10-15 mm. long; calyx-lobes retrorsely scabrous on the margins near the base. Coastal freshwater swamps and bogs. Cent. Calif. (Endemic) ..... C. CALIFORNICA
15. Stem slender to robust, firm, erect or decumbent (sometimes reclining or pendant in *C. rotundifolia*, but then without retrorse pubescence or rotate corolla), never retrorsely scabrous, though sometimes hispidulous with some reflexed hairs (*C. prenanthoides*); inflorescence lax or strict; corolla various but often longer than 20 mm.; capsule various, sometimes opening near the top. Habitat dry to moist but never a marsh, swamp or bog. 18.
18. Style conspicuously exerted, often recurved; corolla short-campanulate or cut to the middle or beyond and funnelform-spreading or rotate; hypanthium glabrous; inflorescence various but flowers never in terminal head. 19.
19. Corolla cut almost to the base, the lobes linear-lanceolate or broader, rotate or funnelform-spreading. 20.
20. Corolla rotate, the lobes broadly lanceolate to deltoid-ovate; style uniquely declined and upcurved; inflorescence a spike of 1- 3(5)-flowered axillary cymes, usually very floriferous and wand-like; rank, more or less virgate annual (biennial), 28-208 (118) cm. tall, but seldom under 50 cm.; stem very robust; leaves



- attenuate-acuminate, coarsely serrate; capsules slender-obconic, typically in triplets, stiffly erect on straight pedicels, opening near the top. Open woods, borders, shaded roadsides, and bottoms. Widespread, Long Is., through S. Ont. to Minn., southward to N. W. Fla., Miss., and Kan. (Endemic) ..... C. AMERICANA
20. Corolla funnelform-spreading, the lobes linear-lanceolate; style often variously recurved but not regularly declined and upcurved; inflorescence spicate, racemose, or paniculate but not with 3-flowered cymes, few-flowered; slender, hardly virgate perennial (biennial), 20-80 cm. tall, but usually less than 50 cm.; leaves acute to short-acuminate, serrate; capsules hemispherical or urceolate, single or clustered but not in triplets, more or less pendant, on geniculate pedicels, opening at or below the middle. Dry open woods, Transition Zone below 1800 m. Southern B. C. to Cent. Calif., mostly west of Cascade Mts. (Endemic) ..... C. PRENANTHOIDES
19. Corolla cut shallowly, sometimes to the middle but rarely beyond, short-campanulate or funnelform-spreading, the lobes broadly lanceolate to deltoid-ovate, never approaching linear. 21.
21. Inflorescence a profusely branched compound panicle, the flowers numerous; corolla short-campanulate, seldom cut to the middle, 6-8 mm. long; leaves coarsely, almost laciniately toothed; style straight; capsule ovoid to short-obconic, erect, on straight pedicel, opening near the base. Cliffs, dry rocky woods and waysides in Appalachian and Blue Ridge Mts., chiefly at low elevations. S. E. U. S.: Md. to Ga. and Ala., rarely adventive farther north. (Endemic) ..... C. DIVARICATA
21. Inflorescence spicate or racemose, simple or few-branched, the flowers few; corolla funnelform-spreading, cut to about the middle; leaves serrate or crenate-serrate; style often recurved; capsule urceolate or ovoid, more or less pendant, on geniculate pedicel, opening near the middle. Open to dense woods, talus and outcrops, Transition Zone to about 1500 m. Alaska Panhandle to N. Calif., mostly west of Cascade Mts. (Endemic) ..... C. SCOULERI
18. Style included or barely exerted, never recurved; corolla deeply campanulate or funnelform to tubular, rarely cut as deep as the middle; hypanthium frequently pubescent; flowers sometimes in a terminal head. 22.
22. Flowers sessile, in involucrate terminal heads and axillary glomerules; leaves elliptic or oblong to ovate, obtuse or



- acute, crenate-serrate, petiolate below, often clasping above; capsule ovoid, erect, opening near the base. Waysides and waste places. Occasional escape from cultivation. (Eurasian) ..... C. GLOMERATA
22. Flowers with short to long filiform pedicels, solitary or clustered in the axils or in loose to strict racemes or panicles; leaves variously shaped, acuminate, entire to sharply serrate, sessile or petiolate, but never clasping; capsule broadly hemispherical, urceolate, ovoid, or nearly globose, pendant, opening near the base. 23.
23. Hypanthium, calyx-lobes, and midveins outside unexpanded corolla bristly with white hairs, 0.5-1.5 (2.0) mm. long; lower cauline leaves deltoid or deltoid-ovate, distinctly petiolate, coarsely sharp-serrate or lacinate to crenate-serrate; flowers erect or spreading, in pedunculate axillary clusters or on slender pedicels, forming a loose raceme or panicle. Waysides and waste places. Frequent escape from cultivation. (Eurasian) ..... C. TRACHELIUM
23. Hypanthium and calyx-lobes glabrous or hispidulous, the hairs to 0.2 (0.5) mm. long; unexpanded corolla glabrous on the midveins; lower cauline leaves linear or narrowly to broadly lanceolate, sometimes sessile, entire or toothed; flowers divergent or nodding; inflorescence various. 24.
24. Hypanthium and calyx-lobes glabrous; flowers on slender pedicels, terminal and axillary, sometimes forming loose raceme or panicle, never secund; lower cauline leaves linear or narrowly lanceolate, sessile or acuminately tapered to winged petiole, entire or remotely serrulate (infrequently close-serrate); stems slender, more or less delicate, virgate or lax and decumbent, sometimes reclining or pendant from cliffs and crevices; corolla blue. Rocky or sandy shores, cliffs, mesophytic canyons and bottoms, open woods, and subalpine meadows. Widely distributed from E. Aleut. Is. to Greenl., southward to northern Mex., W. Tex., Mo., and W. Va. (Circumpolar, wide-ranging from temperate to arctic regions; cf. 14 above) ..... C. ROTUNDIFOLIA  
[Many Alaskan specimens and occasional others have broadly lanceolate or ovate, distinctly petiolate, and often closely serrate leaves; otherwise the characters are the same.]
24. Hypanthium, calyx-lobes and pedicels usually his-



pidulous; flowers on short pedicels, often nearly sessile, forming a strict, secund, spicate raceme; lower cauline leaves ovate-lanceolate, abruptly tapered to distinct, wingless petiole, finely to coarsely crenate-serrate; stems robust, the plants coarse and strictly erect; corolla violet. Waysides and waste places. Very common escape from cultivation, often becoming naturalized. (Eurasian) ....

..... C. RAPUNCULOIDES

<sup>1</sup>Unless specifically modified, the terms "alpine" and "arctic" are used broadly here, as is customary, including those habitats or regions that more properly should be called "subalpine" and "subarctic."

<sup>2</sup>This is an observed range, and the parenthetic number is the mode, the most frequently observed value, not the mean. For characters having such narrow ranges of variability as this, the mode is perhaps more useful than the mean.

<sup>3</sup>By "corolla . . . spreading or nodding" is meant, technically, "flower . . . spreading or nodding," here and in all similar places in the key.

#### CHECKLIST OF THE SPECIES

CAMPANULA L. Bellflowers, Bluebells, Campanulas, Harebells. (Species prefixed with an asterisk (\*) are endemic to North America.)

- \*1. C. AMERICANA L. (*C. acuminata* Michx.; *Campanulastrum americanum* (L.) Small). Tall Bellflower. N = 51. Perhaps the most characteristic American species.
- \*2. C. ANGUSTIFLORA Eastw. Eastwood's Harebell.
- \*3. C. APARINOIDES Pursh. (Incl. *C. uliginosa* Rydb.). Eastern Marsh Bellflower. Rydberg's *C. uliginosa*, the large-flowered form of the eastern marsh bellflower, is in its extreme quite distinct and, while hardly a good species, probably merits recognition as a separate race.
- \*4. C. AURITA Greene. Yukon Bellflower.
- \*5. C. CALIFORNICA (Kell.) Heller. (*Wahlenbergia californica* Kell.; *C. linnaeifolia* A. Gray). California Swamp Harebell.
- 6. C. CHAMISSONIS Fëdorov. (*C. dasyantha* auct. pl., non M. á Bieb.; *C. pilosa* sensu A. Gray, non Pall. ex Roem. et Schult.). Aleutian Bellflower. N = 17.
- \*7. C. DIVARICATA Michx. (*C. flexuosa* Michx.). Appalachian Bellflower. N = 20.
- \*8. C. EXIGUA Rattan. Chaparral Campanula.
- \*9. C. FLORIDANA S. Wats. ex A. Gray. (*Rotantha floridana* (S. Wats. ex A. Gray) Small). Florida Campanula. This species may prove to be merely a southern race of the widespread *C. aparinoides*.

[C. GLOMERATA L. Clustered Bellflower. N = 17, 34. Introduced.]

- 10. C. LASIOCARPA Cham. Alaska Bellflower. In the Aleutians this



species frequently grows intermixed with *C. chamissonis*, and the two species are often confused by collectors and taken as one species, getting mounted on one herbarium sheet. Several good characters distinguish them, however, and only the most depauperate specimens should cause trouble (cf. key).

- \*11. *C. PARRYI* A. Gray. (*C. planiflora* Engelm., non Lam.; *C. langsdorffiana* sensu A. Gray, non Fischer ex A. DC.). Rocky Mountain Bellflower. N = 17 [Shetler, in manuscript]. Plants from Washington, Idaho, and Montana tend to differ from typical *C. parryi* by having entire calyx-lobes and leaves. The calyx-lobes and the corolla, which is borne on a shorter peduncle, are shorter on the average. In these characters and in the not infrequent puberulence of the hypanthium, the plants of this general region approach the otherwise quite distinct *C. scabrella*. McVaugh (1942) segregated these plants as var. *idahoensis* of *C. parryi*. Recent floristic workers in the Rocky Mountain region have generally followed him. While McVaugh's taxon seems distinct enough on the whole, at least as he originally circumscribed it, further study is required to determine its true affinities. Some evidence suggests that it may represent a hybrid series between *C. parryi* and *C. scabrella*, and again other pieces of evidence hint that var. *idahoensis* has become a catch-basket epithet for several discordant elements and that certain plants hitherto referred here might in fact represent an as yet undescribed species. Until this question is resolved, occasional plants will continue to turn up from the Pacific Northwest that can be relegated to *C. parryi*, as var. *idahoensis*, only with doubt. This is particularly true of plants from the Wenatchee Mountains of Washington and the mountains of southwestern Montana. Most of the plants from these areas presently available in collections are in the flowering condition, and what are urgently needed are mature capsules.
- \*12. *C. PIPERI* Howell. Olympic Bellflower. N = 17.
- \*13. *C. PRENANTHOIDES* Durand. (*Asyneuma prenanthoides* (Durand) McVaugh). California Harebell. By itself, this species strikingly resembles species of the Asiatic genus *Asyneuma*, to which McVaugh (1945) has referred it. But the degree to which *C. prenanthoides* shares its characters in varying combinations with other American campanulas is such that I find no compelling reasons at present for separating it from the other 19 species recognized here. Quite possibly intensive study will require a rather extensive realignment in the family Campanulaceae as a whole, but until more convincing and comprehensive data are available, isolation of this one American species seems premature.



[*C. RAPUNCULOIDES* L. Rover Bellflower. N = 51. Introduced. By far the most common garden escape. Widely adventive or naturalized along roadsides and borders, it is frequently confused with the native *C. americana*, which it only superficially resembles. Apart from the rank habit and sometimes similar habitat, these plants are wholly unlike.]

\*14. *C. REVERCHONI* A. Gray. Texas Bellflower.

\*15. *C. ROBINSIAE* Small. (*Rotantha robinsiae* (Small) Small). Despite the fact that Small (1933, p. 1508) put this species in the segregate genus *Rotantha*, which he erected, along with *C. floridana*, because they share the rotate corolla, these species are not at all closely related. As Small (1926) himself so aptly pointed out in his original description, *C. robinsiae* is most closely related to the Texan *C. reverchoni*. According to him (p. 36), "It differs conspicuously, however, in the glabrous leaves, the short hypanthium, the smaller calyx, the smaller corolla with a shorter tube, and the subglobose capsule." The distribution of this species is so restricted (Chinsegut Hill, Fla.) that one is led to raise certain questions about its origin. This part of Florida is not particularly noteworthy for local endemics, and in fact it is a bit hard to explain how this species or any other has come to survive only here. As one can readily see upon visiting Chinsegut Hill, the immediate vicinity has been disturbed by cultivation and plantings for a considerable period of time, and the possibility must not be ruled out that *Campanula robinsiae* represents a pre-1926 Eurasian introduction, perhaps accidental.

16. *C. ROTUNDIFOLIA* L. s.l. (Incl.: *C. r.* var. *alaskana* A. Gray; *C. heterodoxa* auct., non Vest in Roem. et Schult.; *C. intercedens* auct., non Witasek; *C. latisepala* Hult.; *C. linifolia* auct., non Scop.; *C. macdougalii* Rydb.; *C. petiolata* A. DC., *C. rotundifolia* × *latisepala* sensu Hult.; *C. sacajaweana* Peck; *C. scheuchzeri* auct., non Vill.). Harebell, Bluebells-of-Scotland. N = 17, 28, 34. This species is extremely polymorphic in North America, as throughout the Old World, and is comprised of several geographic races, which I have been studying. For the purposes of this synopsis, I have united the numerous biotypes under the single taxon, *C. rotundifolia*, which thereby becomes by far the most cosmopolitan North American campanula. It is the only species known from Mexico, where it has been collected in the states of Coahuila, Nuevo León, and Tamaulipas.

Owing to its extreme variability, it is from time to time confused with almost every other American species. In the Rocky Mountain region, particularly, it is often confused with *C. parryi*, which however is amply distinct. The two species are distinguishable at a glance when mature capsules are



present, but good floral and vegetative characters also exist (cf. key).

\*17. *C. SCABRELLA* Engelm. Downy Alpine Bellflower.

\*18. *C. SCOULERI* Hook. ex A. DC. Scouler's Harebell. In addition to the means provided in the key, it can be distinguished from *C. prenanthoides*, to which it is most similar, as follows. While the latter is usually quite leafy below the inflorescence, having 12 or more leaves which are sessile, *C. scouleri* tends to have fewer than 10 leaves which are mostly petiolate. The lowest cauline leaves of *C. scouleri* are also more broadly ovate, often nearly rotund.

[*C. TRACHELIUM* L. Nettle-leaved Bellflower, Throatwort. N = 17. Introduced. Of the species included here, it is more similar to *C. rapunculoides*, from which it can readily be distinguished by the pubescence.]

19. *C. UNIFLORA* L. Arctic Campanula. The only truly high alpine-high arctic campanula in North America. Single-flowered specimens of *C. parryi* and *C. rotundifolia* are mistaken for it frequently in the Rocky Mountain region, but there is little excuse for this. The much rarer *C. uniflora* is quite distinct and has no close relatives here. On the average it occurs at higher elevations than either of the other species. Typically, the hypanthium has long white trichomes, as *C. chamissonis* and *C. lasiocarpa*, but in the Colorado Rockies plants with a glabrous hypanthium are common. Perhaps they should be segregated as a separate geographic race, but further study is needed.

\*20. *C. WILKINSIANA* Greene. Wilkins' Harebell. An endemic of Mt. Shasta and the Trinity Mountains in California, this campanula is surely quite close to the Olympic Mountain endemic of Washington, *C. piperi*.

#### DOUBTFUL AND EXCLUDED SPECIES

*C. DASYANTHA* M. á Bieb. (*C. pallasiana* Vest in Roem. et Schult.; *C. pilosa* Pall. ex Roem. et Schult.). An Asian species (not the *C. dasyantha* of American authors, cf. *C. chamissonis*) that does not to my knowledge occur in North America, despite the range statement of Fëdorov in "Flora SSSR" (vol. 24: 278), including Canada.

*C. RENTONAE* Senior. Described from plants grown in culture from seed originating in the Wenatchee Mountains of Washington. It seems to belong to the *Parryi-Scabrella* series usually referred to *C. parryi* var. *idahoensis*, but needs more study.

#### COMMENTS

The single most striking fact deriving from this con-



spectus is that of the 20 species recognized as native to North America 16 (80%) are endemic, sometimes to a very localized area of the continent. The specific differences among the 20 species, though in some cases quite small, are nonetheless remarkably stable, and few taxonomists would dispute the discreteness of these species. If anything, the inclination might be to split several of them into two or more smaller species. Perhaps significantly, the endemics are confined largely to unglaciated parts of North America — areas south of maximum ice advance, refugial islands within the continental ice sheet, or areas where discontinuous montane glaciers might have left sufficient nunataks for hardy species, like some of the Western endemic alpine bellflowers, to survive. Species illustrative of these three types of survival areas would be *C. divaricata* (Appalachians), *C. aurita* (Yukon Tablelands), and *C. parryi* (Rockies), respectively. Although two widespread Eastern endemics, *C. americana* and *C. aparinoides*, presently occur inside the southern margin of the glaciated region, this distribution probably represents a post-Pleistocene invasion from the south. Whether these and other endemic species occupied much greater areas of the glaciated region prior to Pleistocene times is hard to say, but it is very doubtful that any have done so in recent times. Greenland is without endemic species. Only *C. rotundifolia* and *C. uniflora*, both circumpolar, occur there as also in the Canadian Eastern Arctic.

So highly endemic and localized is the North American campanula flora that one is tempted in constructing a key to ignore the morphological characters and use geographical and ecological criteria for the primary dichotomies. The utility of geography is at once apparent from the following breakdown, in which I have divided North America into a number of arbitrary, though partially natural, regions and listed under each those species of *Campanula* native throughout or in some part of that region. For highly localized species, the exact area is listed in parenthesis after the species. Any given species may appear in more than



one regional list, but the endemics, which are starred (\*), are generally confined to one of the regions. If not, they are starred only in the region of their principal range (cf. *C. americana*). Thus, by observing asterisks one can quickly grasp the relative distribution across North America of the 16 endemic species.

#### ALASKA AND NORTHWEST CANADA

- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| * <i>C. aurita</i>                | <i>C. rotundifolia</i>                |
| <i>C. chamissonis</i> (Aleutians) | <i>C. scouleri</i> (Alaska Panhandle) |
| <i>C. lasiocarpa</i>              | <i>C. uniflora</i>                    |

#### CANADIAN EASTERN ARCTIC AND GREENLAND

- |                        |                    |
|------------------------|--------------------|
| <i>C. rotundifolia</i> | <i>C. uniflora</i> |
|------------------------|--------------------|

#### PACIFIC STATES AND ADJACENT BRITISH COLUMBIA

- |  |                                  |
|--|----------------------------------|
| * <i>C. angustiflora</i> (Calif.)        | * <i>C. prenanthoides</i>        |
| * <i>C. californica</i> (Calif.)         | <i>C. rotundifolia</i>           |
| * <i>C. exigua</i> (Calif.)              | * <i>C. scabrella</i>            |
| <i>C. lasiocarpa</i> (N. Wash., S. B.C.) | * <i>C. scouleri</i>             |
| <i>C. parryi</i> (C. Wash.)              | * <i>C. wilkinsiana</i> (Calif.) |
| * <i>C. piperi</i> (Wash.)               |                                  |

#### ROCKY MOUNTAIN REGION (Northern Mex. to C. Alta.)

- |                              |                        |
|------------------------------|------------------------|
| <i>C. lasiocarpa</i> (Alta.) | <i>C. rotundifolia</i> |
| * <i>C. parryi</i>           | <i>C. uniflora</i>     |

#### NORTHCENTRAL AND NORTHEASTERN U. S. AND ADJACENT CANADA

- |                         |                            |
|-------------------------|----------------------------|
| * <i>C. americana</i>   | <i>C. rotundifolia</i>     |
| * <i>C. aparinoides</i> | <i>C. uniflora</i> (Gaspé) |

#### SOUTHCENTRAL U. S.

(All species infreq. and scattered or very localized)

- |                       |                                    |
|-----------------------|------------------------------------|
| <i>C. americana</i>   | * <i>C. reverchonii</i> (C. Texas) |
| <i>C. aparinoides</i> | <i>C. rotundifolia</i>             |

#### SOUTHEASTERN U. S.

- |                        |                              |
|------------------------|------------------------------|
| <i>C. americana</i>    | * <i>C. floridana</i> (Fla.) |
| <i>C. aparinoides</i>  | * <i>C. robinsiae</i> (Fla.) |
| * <i>C. divaricata</i> |                              |

Any thoroughgoing consideration of relationships is not possible at present and speculation is premature; neverthe-



less, the following species-groups are patent even to the casual student:

I. DWARF ANNUAL ENDEMIC

- C. angustiflora*
- C. exigua*
- C. reverchoni*
- C. robinsiae*

II. ARCTIC-ALPINE ENDEMIC

- C. aurita*
- C. parryi*
- C. piperi*
- C. scabrella*
- C. wilkinsiana*

III. MARSH-SWAMP-BOG ENDEMIC

- C. aparinoides*
- C. californica*
- C. floridana*

IV. PACIFIC COASTAL FOREST ENDEMIC

- C. prenanthoides*
- C. scouleri*

V. AMPHI-PACIFIC ARCTIC SPECIES

- C. chamissonis*
- C. lasiocarpa*

In conclusion, it should be emphasized again that this synopsis is not in any way offered as a revision of *Campanula* in North America. At the same time there is little reason to expect that such a revision, when it does appear, will alter the present alignment of species greatly if at all. But while the *species* are reasonably well defined, the story at the lower levels is somewhat different. Insofar as the New World is concerned, the problems of *Campanula* have to do mainly with infraspecific variation and the question of geographic races within several of the more widespread and polymorphic species (e. g., *C. aparinoides*, *C. rotundifolia*).

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LITERATURE CONSULTED

- ABRAMS, L., AND R. S. FERRIS. 1960. Illustrated Flora of the Pacific States. Vol. IV, pp. 72-77. Stanford Univ. Press, Stanford.
- BÖCHER, T. W., K. HOLMEN, AND K. JAKOBSEN. 1957. Grønlands Flora. pp. 195-196. P. Haase and Sons, Copenhagen.
- DARLINGTON, C. D., AND A. P. WYLIE. 1955. Chromosome Atlas of Flowering Plants. pp. 287-289. George Allen and Unwin Ltd., London.
- FERNALD, M. L. 1950. Gray's Manual of Botany. Ed. 8. pp. 1351-1353. American Book Co., New York.
- FËDOROV, A. 1957. "Campanulaceae." *In* Flora SSSR, vol. 24, pp. 126-476, Acad. Sci. USSR, Leningrad. [In Russian]
- GLEASON, H. A. 1952. The New Britton and Brown Illustrated Flora. Vol. 3, pp. 314-316. Lancaster Press, Inc., Lancaster (Pa.).
- , AND A. CRONQUIST. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. pp. 662-663. D. Van Nostrand Co., Princeton.
- GRAY, A. 1886. Synoptical Flora of North America. Vol. 2, pt. I, Gamopetalae after Compositae, ed. 2, pp. 11-14, 395-96. Ivison, Blakeman, Taylor and Co., New York.
- HARRINGTON, H. D. 1954. Manual of the Plants of Colorado. pp. 525-526. Alan Swallow, Denver.
- HITCHCOCK, C. L., et al. 1959. Vascular Plants of the Pacific Northwest. Pt. 4, pp. 483-488. Univ. Wash. Press, Seattle.
- HULTÉN, E. 1960. Flora of the Aleutian Islands. Ed. 2. pp. 336-339. J. Cramer, Weinheim.
- . 1949. Flora of Alaska and Yukon. Pt. 9. Lunds Univ. Årsskr. II Sect. 2, bd. 45: 1455-1464.
- MCVAUGH, R. 1942. A new Campanula from Idaho. Bull. Torrey Club 69: 241-243.
- . 1945. Notes on North American Campanulaceae. Bartonia 23: 36-40.
- . 1951. "Campanulaceae." *In* Flora of Texas, by C. Longworth and collaborators. Vol. 3, pt. 5, pp. 331-366. Southern Methodist Univ. Press, Dallas.
- MUNZ, PHILIP A. 1959. A California Flora. pp. 1062-1063. Univ. Calif. Press, Berkeley.
- RYDBERG, P. A. 1922. Flora of the Rocky Mountains and Adjacent Plains. Ed. 2. pp. 823-824. Hafner Publishing Co., New York. (Reprint, 1954)



- \_\_\_\_\_. 1932. Flora of the Prairies and Plains of Central North America. pp. 756-757. N. Y. Bot. Gard., New York.
- SMALL, J. K. 1903. Flora of the Southeastern United States. pp. 1140-1141. Published by the author, New York.
- \_\_\_\_\_. 1926. A new bellflower from Florida. *Torreyia* 26: 35-36.
- \_\_\_\_\_. 1933. Manual of the Southeastern Flora. pp. 1289-1290. Published by the author, New York.

#### ALPINE ZONE OF THE PRESIDENTIAL RANGE<sup>1</sup>

This attractive booklet describes certain aspects of the geology, climate and organisms of the Presidential Range of New Hampshire. There is a brief section on mammals, birds and insects, but most of the space is devoted to plants. Included is a checklist of plants of the alpine zone with photographs, descriptions and discussions of a number of them. There is also an interesting discussion of the ecology of the region, a topic on which Dr. Bliss speaks with authority.

The descriptions and photographs of the plants should be helpful to a beginner to the area. However, the ranges of many of the plants are much more extensive than is indicated. For example, *Salix Uva-ursi* is stated to be "common in Alpine Garden near some of the streams and also on the summits of Mts. Franklin and Pleasant." Actually this plant, as noted by Pease in his "Vascular Flora of Coos County," is common throughout the alpine region, extending from Mt. Madison to Mt. Clinton and descending quite low on open ridges and ravines.

The booklet contains a number of errors and omissions. Of *Potentilla Robbinsiana*, the most interesting plant in the Range, it is stated "that the only place in the world it occurs . . . is at the east end of Mt. Monroe cone." Actually it also occurs on the Franconia Range and is represented from there by a number of collections. He states of *Geum Peckii* "restricted to the Presidential and Franconia Ranges of the White Mountains." It occurs at several lowland stations between these ranges, on Cannon Mt., for example, and also